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ABSTRACT

This articulation project includes competencies for secondary and postsecondary vocational agriculture in the cluster areas of animal science, plant science, and agricultural management. Each cluster includes three types of competencies: secondary competencies; postsecondary competencies; and a combination of secondary and postsecondary competencies. Each type of competency appears on a separate list. All lists are arranged by topic rather than by class or course. (KC)

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ED316673

Secondary and Postsecondary Agricultural Competency Articulation

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SECONDARY AND POSTSECONDARY AGRICULTURAL COMPETENCY ARTICULATION

The cluster areas of animal science, plant science, and agricultural management are included in this articulation project. Each cluster includes three types of competencies: secondary competencies, postsecondary competencies, and a combination of secondary and postsecondary competencies. Each type of competency appears on a separate list.

All lists are arranged by topic rather than class or course. For example, marketing competencies that are specific to dairy production would appear under the dairy heading, while general marketing competencies would appear under the marketing heading.

Please notice that the secondary competency list has no heading or competency numbers, whereas the postsecondary list has heading letters (e.g., A, N) and competency numbers (e.g., 3, 17). The combined lists use the secondary list as the base and line up postsecondary competencies where they correspond.

The example below, from the combined competencies for agricultural management, illustrates how the combined lists are keyed. Competencies which are not preceded by a number are secondary competencies. Competencies listed below that are preceded by a letter and a number (e.g., N1) are postsecondary competencies, which do not correspond to any of the secondary competencies under that heading. If the competency has been identified as both secondary and postsecondary, the letter and number of the postsecondary competency (e.g., N3) is in parentheses following the secondary competency for which the postsecondary competency matches. Postsecondary competencies N17 and N18 both correspond to the preceding secondary competency.

VERBAL COMMUNICATIONS

Relate steps for effective idea presentation and communication.
Analyze components of the skills of listening and answering questions.
Demonstrate acceptable procedures for answering business telephones and taking telephone messages in an agribusiness setting.
(N17) Demonstrate proper techniques for answering a business telephone.
(N18) Take accurate telephone messages.
Explain the role and ramifications of nonverbal communications with regard to verbal communications.(N3)
N1 - Demonstrate verbal communication skills.

A disk copy of the competency lists has been provided. The files are in MS DOS.

AGMGTCOM.MRG = Agricultural Management combined competencies
AGMGTCOM.PS = Agricultural Management postsecondary competencies
AGMGTCOM.SEC = Agricultural Management secondary competencies
ANSCICOM.MRG = Animal Science combined competencies
ANSCICOM.PS = Animal Science postsecondary competencies
ANSCICOM.SEC = Animal Science secondary competencies
PLSCICOM.MRG = Plant Science combined competencies
PLSCICOM.PS = Plant Science postsecondary competencies
PLSCICOM.SEC = Plant Science secondary competencies

SECONDARY COMPETENCIES FOR ANIMAL SCIENCE

ANIMAL BREEDING

Identify and describe the function of the parts of the male reproductive system in cattle and swine.
Identify and describe the function of the parts of the female reproductive system in cattle and swine.
Describe the heritability of traits in animals.
Describe procedures for making genetic improvements in livestock.
Outline a breeding improvement program for swine.
Outline a breeding improvement program for beef.

ANIMAL NUTRITION

Compare the digestive systems of ruminants and non-ruminants and determine how the differences between them affect feeding practices.
List the basic nutrient requirements and six elements of a ration.
Balance a simple ration.
List common rules of thumb for feeding livestock.

MARKETING

Describe livestock marketing trends.
Explain how cattle prices are determined.
Explain how the value of market hogs is determined.
Explain the carcass weight and grade method of marketing livestock.
Describe how feeder cattle and feeder pigs are marketed.
Outline methods of marketing livestock using forward contracting and production contracts.
Explain how future markets are used to market livestock.

BEEF

Combine production information and visual selection to choose superior beef animals.
Plan a program for managing a breeding herd during breeding and gestation.
Plan a program for managing a herd from calving through weaning.
Plan a management program for backgrounding calves for economical gains.
Describe how to finish cattle to an economical finishing weight.
Determine the profitability of a beef enterprise.
Calculate the cost of production for a beef enterprise.
Evaluate the comparative advantages (labor vs. capital) of the beef enterprise.
Evaluate the major types of beef markets available.
Describe the marketing options available for beef.
Identify production strategies that will fulfill the chosen beef marketing strategy.
Identify local, state, and federal regulations, as they apply to beef production.
Describe government programs and how they affect the beef industry.
Identify the different beef associations and organizations.
Select breeding stock that will increase the productivity of the beef herd.
Describe the different breeding systems for beef.
Evaluate the different facilities for producing beef.
Develop a herd health program for the different beef enterprises.
Evaluate feedstuffs for the most profitable balanced ration.
Plan a pasture and roughage program for profitable beef production.

SWINE

Select the correct type of swine for efficient, economical production.
Identify practices for management of the breeding herd during breeding and gestation.
Plan a program for managing and caring for the sow and pigs.
Develop a management plan for raising and finishing hogs for maximum returns.
Determine the profitability of a swine enterprise.
Calculate the cost of production for a swine enterprise.
Evaluate the comparative advantages (labor vs. capital) of the swine enterprise.
Evaluate the major types of swine markets available.
Describe the marketing options available for swine.
Identify production strategies that will fulfill the chosen swine marketing strategy.
Identify local, state and federal regulations, as they apply to swine production.
Identify government programs and how they affect the pork industry.
Identify the different pork associations and organizations.
Select breeding stock that will increase the productivity of the swine herd.
Describe the different breeding systems for swine.
Evaluate the different facilities for producing swine.
Develop a herd health program for the different swine enterprises.
Evaluate feedstuffs for most profitable balanced ration.

SHEEP

Identify the opportunities available in the sheep industry.
Combine information and visual selection to choose superior sheep.
Manage a breeding flock during breeding and gestation.
Manage a flock from lambing to weaning.
Manage a flock from weaning to market.
Determine proper prevention and/or control methods of common parasites, diseases, and predators.
Determine the profitability of a sheep enterprise.
Calculate the cost of production for a sheep enterprise.
Evaluate the comparative advantages (labor vs. capital) of the sheep enterprise.
Identify local, state and federal regulations, as they apply to sheep production.
Evaluate the major types of sheep and wool markets available.
Describe the marketing options available for sheep and wool.
Identify production strategies that will fulfill the chosen sheep and wool marketing strategy.
Describe government programs and how they affect the sheep industry.
Identify the different sheep associations and organizations.
Select breeding stock that will increase the productivity of the sheep flock.
Describe the alternative breeding systems for sheep.
Evaluate the different facilities for producing sheep.
Develop a flock health program for the different sheep enterprises.
Evaluate feedstuffs for the most profitable balanced rations.
Describe flock protection from predators.

DAIRY

Select profitable dairy cows for the herd.
Plan a feeding program for maximum milk production.
Plan a dairy herd health program.
Plan a management program for the milking herd to maximize dairy returns.
Plan a management program for raising replacement heifers from birth to freshening.
Determine the profitability of a dairy enterprise.

Calculate the cost of production for a dairy enterprise.
Evaluate the comparative advantages (labor vs. capital) of the dairy enterprise.
Describe the process of milk secretion.
Describe milking and sanitation procedures that will assure quality milk.
Evaluate the different dairy record and testing systems available.
Plan a profitable milk marketing system.
Develop a marketing system for replacement animals.
Identify local, state and federal regulations, as they apply to dairy production.
Select production practices to match marketing strategies.
Describe government programs and how they affect the dairy industry.
Identify the different dairy associations and organizations.
Select breeding animals that will increase the productivity of the dairy herd.
Describe reproductive technology for dairy.
Analyze the farm situation and select the appropriate facilities and equipment for milk production.
Evaluate feedstuffs for the most profitable balanced ration.
Plan a pasture and roughage program for profitable milk production.
Describe marketing and pricing methods for milk.
Explain how dairy products are marketed.
Describe how fluid and blend prices for milk are determined.

POULTRY

Describe the importance of the poultry industry.
Select and evaluate poultry.
Describe how to meet the nutritional needs of poultry.
Plan housing and equipment for raising poultry.
Describe procedures for promoting flock health and sanitation.
Describe various marketing channels for poultry and eggs.

MEATS

Identify the career opportunities in the meat industry.
Describe the classifications and grading of meats.
Identify the wholesale and retail cuts of beef.
Identify the wholesale and retail cuts of pork.
Identify the wholesale and retail cuts of lamb.
Describe how meat is evaluated and the steps in judging meat.
Describe the meat inspection process.

INTRODUCTION TO SPECIALTY ANIMAL PRODUCTION

Identify possibilities for specialty animal production.
Determine the profitability of selected specialty animal enterprises.
Evaluate the comparative advantages (labor vs. capital) of the selected specialty animal enterprise.
Identify local, state and federal regulations, as they apply to specialty animal production.
Evaluate the marketing options available for specialty animals.

BEES

Evaluate the different facilities for producing bees.
Develop a check list of bee hive management techniques.
Determine the labor requirements for raising bees.

Develop a health management program for bees.
List the steps to follow when harvesting honey

COMPANION ANIMALS

Evaluate the different facilities for producing companion animals.
Identify a ration to meet the nutritional needs of companion animals.
Determine the labor requirements for producing companion animals.
Develop a health program for companion animals.
Develop a sound breeding program for companion animals.
Demonstrate proper grooming techniques for companion animals.

FISH

Evaluate the different facilities for producing fish
Identify a ration to meet the nutritional needs of fish.
Outline procedures for fingerling production.
Determine the labor requirements for producing fish.
Develop a health program for fish.

FUR ANIMALS

Evaluate the different facilities for producing fur animals.
Describe the different breeding systems for fur animals.
Identify a ration to meet the nutritional needs of fur animals.
Determine the labor requirements for producing fur animals.
Develop a health program for fur animal production.

GOATS

Evaluate the different facilities for producing goats.
Identify a ration to meet the nutritional needs of goats.
Determine the labor requirements for producing goats.
Develop a health program for goat production.
Plan a breeding program for goats.
Demonstrate proper grooming techniques for goats.

HORSES

Determine the profitability of a horse enterprise.
Calculate the cost of production for a horse enterprise.
Evaluate the comparative advantages (labor vs. capital) of the horse enterprise.
Identify local, state and federal regulations, as they apply to horse production.
Evaluate the major types of horse markets available.
Describe the marketing options available for horses.
Identify the different horse associations and organizations.
Select high quality breeding animals.
Describe the different breeding systems for horses.
Evaluate the different facilities for producing horses.
Develop a herd health program.
Identify a ration to meet the nutritional needs of horses.
Identify proper grooming techniques and tack for horses.

LABORATORY ANIMALS

Evaluate the different facilities for producing laboratory animals.
Describe the different breeding systems for laboratory animals.
Identify a ration to meet the nutritional needs of laboratory animals.
Determine the labor requirements for producing laboratory animals.
Develop a health program for laboratory animal production.

RABBITS

Evaluate the different facilities for producing rabbits.
Describe the different breeding systems for rabbits.
Identify a ration to meet the nutritional needs of rabbits.
Determine the labor requirements for rabbit production.
Develop a health program for rabbit production.

POSTSECONDARY COMPETENCIES FOR ANIMAL SCIENCE

A INTRODUCTION TO ANIMAL SCIENCE

1 Outline the history of the animal industry.
2 Explain how the animal industry relates to state and national economy.
3 Describe the scope of the livestock industry in Missouri.
4 Describe animal economics.
5 Identify career possibilities in animal science.

B ANATOMY

1 Identify basic components of a cell.
2 Identify cell types.
3 Identify muscle types.
4 Identify muscle groups.
5 Identify skeletal systems by species.
6 Identify skeletal variations.
7 Identify types of connective tissues.
8 Identify the parts of the digestive system.
9 Identify the parts of the cardiovascular system.
10 Identify the parts of the nervous system.
11 Identify the parts of the reproductive system.
12 Identify the parts of the endocrine system.
13 Identify the parts of the respiratory system.
14 Identify the organs of special sense.
15 Drench beef and dairy animals.

C PHYSIOLOGY

1 Describe the functions of the cell.
2 Describe the functions of bones.
3 Describe the functions of muscles.
4 Describe the functions of connective tissue.
5 Describe the functions of digestive system.
6 Describe the functions of cardiovascular system.
7 Describe the functions of nervous system.
8 Describe the functions of reproductive system.
9 Describe the functions of endocrine system.
10 Describe the functions of respiratory system.
11 Describe the functions of organs of special sense.

D BREEDS

1 Identify breed characteristics and types of beef cattle.
2 Identify breed characteristics and types of dairy cattle.
3 Identify breed characteristics and types of sheep.
4 Identify breed characteristics and types of goats.
5 Identify breed characteristics and types of swine.
6 Identify breed characteristics and types of horses.
7 Identify breed characteristics and types of poultry.
8 Distinguish between purebred and crossbred animals.
9 Explain complimentary crosses.

E PRODUCTION PRACTICES

General

1 Describe cost-effective production practices.
2 Maintain individual and herd production records.
3 Analyze herd production statistics (e.g., birth and weaning weights).
4 Explain the advantages of performance testing.
5 Calculate performance data using production records.
6 Describe care and use of livestock equipment (e.g., clippers, syringes).
7 Describe the types of breeding management programs.
8 Identify reproductive attributes in breeding stock.
9 Select breeding stock using performance data.
10 Select breeding stock using visual appraisal.

Swine

11 Clip needle teeth in swine.
12 Vaccinate swine.
13 Dock tails in swine.
14 Castrate swine.
15 Administer iron shots to swine.
16 Repair a hernia in swine.
17 Notch ears for identification in swine.
18 Treat swine for mange and lice.

Beef and Dairy

19 Vaccinate beef and dairy cattle.
20 Dehorn beef and dairy cattle.
21 Castrate beef and dairy cattle.
22 Perform identification techniques in beef and dairy cattle (e.g., branding, tagging, and tattooing).
23 Treat beef and dairy for pinkeye.
24 Trim hooves in beef and dairy animals.
25 Feed beef and dairy through stomach tubes.
26 Implant growth hormones in beef and dairy.
27 Drench beef and dairy animals.
28 Identify mastitis in goats, and beef and dairy cattle using the California Mastitis Test.
29 Demonstrate proper milking procedures and equipment use.

Sheep

30 Vaccinate sheep.
31 Castrate sheep.
32 Dip sheep.
33 Tag sheep.
34 Dock tails on sheep.
35 Clip wool on sheep.
36 Drench sheep.
37 Shear sheep.
38 Trim hooves of sheep.
39 Disbud horns of sheep.

Horses

40 Trim hooves of horses.
41 Shoe a horse.
42 Vaccinate a horse.
43 Deworm a horse.
44 Float teeth in horses.
45 Explain why horses are not castrated at an early age.

F NUTRITION

1 Describe the basic nutrients needed by livestock.
2 Distinguish among amino acids that are essential for livestock production.
3 Describe the basic minerals and their functions.
4 Describe the basic vitamins and their functions.
5 Outline nutrient requirements for each species.
6 Identify quality feed stuffs.
7 Differentiate between types of feedstuffs.
8 Describe feed processing and storage.
9 Formulate a complete ration for each species.
10 Calculate a least-cost ration.
11 Describe the usage of feed additives.
12 Describe the different nutritional requirements for maintenance, growth, and production.
13 Identify diseases caused by nutritional deficiencies.
14 Calculate feed efficiency.
15 Calculate rate of gain.
16 Calculate production index.

G REPRODUCTION

1 Describe the different breeding systems.
2 Outline the gestation length of each species.
3 Outline the estrus cycle of each species.
4 Explain methods of heat detection.
5 Discuss methods of heat synchronization.
6 Describe proper techniques for artificial insemination.
7 Describe characteristics of quality semen.
8 Describe the components of a breeding soundness examination.
9 Describe procedures for pregnancy diagnosis.
10 Discuss embryo transfer.
11 Identify signs of parturition.
12 Assist in delivery of the newborn.
13 Identify medical signs requiring veterinary assistance.
14 Outline procedures for care of the newborn.
15 Describe nutritional changes that relate to reproduction.
16 Describe disease processes that affect reproduction.

H GENETICS

1 Define Mendel's Law of Inheritance.
2 Distinguish between dominant and recessive traits.
3 Define genotype and phenotype.
4 Illustrate the meaning of heterosis (i.e., hybrid vigor).
5 Explain cell division.
6 Discuss the function of DNA and RNA.
7 Identify different types of gene action.
8 Use heritability estimates to predict genetic progress.
9 Select breeding stock using Expected Progeny Difference (EPD).

I HEALTH

1 Outline a herd health program for each species.
2 Recognize factors that contribute to diseases.

3 Recognize diseases and disease processes.
4 Distinguish between infectious and noninfectious diseases.
5 Describe methods of disease transmission.
6 Identify internal and external parasites.
7 Give examples of parasite control.
8 Administer prescribed treatments.
9 Outline sanitation procedures.
10 Describe methods of disinfection.
11 Describe methods of sterilization.
12 Describe methods of pasteurization.
13 Explain the quarantine process.
14 Maintain health and treatment records.
15 Describe bovine diseases.
16 Describe swine diseases.
17 Describe equine diseases.
18 Describe diseases in sheep and goats.
19 Describe diseases in poultry.

J ANIMAL FACILITIES

1 Describe types of animal housing.
2 Describe the fencing requirements for different species.
3 Describe designs for working chutes and restraint stocks.
4 Describe adequate ventilation and humidity requirements for animal housing.
5 Design facilities with adequate feed and water space.
6 Describe requirements for facilities regulated by the government.

K ANIMAL RESTRAINT

1 Restrain livestock manually.
2 Adjust and operate large animal restraint equipment.
3 Restrain animals with the use of mechanical devices.
4 Describe safe loading and transportation procedures.
5 Demonstrate the use of animal weighing equipment.

L MARKETING

1 Evaluate different types of commodities marketing (e.g., futures, hedging).
2 Outline live animal market grades.
3 Grade animals according to age and quality.
4 Explain grades for animal products.
5 Identify meat and poultry cuts.
6 Prepare an animal for show and sale.
7 Describe consumer product selection and utilization.

M GOVERNMENT REGULATIONS

1 Describe EPA requirements for livestock operations.
2 Identify the roles of the Missouri Department of Natural Resources and the Missouri Department of Agriculture in livestock operations.
3 Describe handling and disposal of animal waste and hazardous materials.
4 Identify local and state ordinances concerning zoning.
5 Describe appropriate carcass disposal.
6 Describe interstate and intrastate livestock shipping regulations.
7 Identify required testing procedures for shipment of animals.
8 Identify drug withdrawal periods of animals for slaughter.

COMBINED COMPETENCIES FOR ANIMAL SCIENCE

INTRODUCTION TO ANIMAL SCIENCE

A1 - Outline the history of the animal industry.
A2 - Explain how the animal industry relates to the state and national economy.
A3 - Describe the scope of the livestock industry in Missouri.
A4 - Describe animal economics.
A5 - Identify career possibilities in animal science.

ANATOMY

B1 - Identify basic components of a cell.
B2 - Identify cell types.
B5 - Identify skeletal systems by species.
B7 - Identify types of connective tissues.
B9 - Identify the parts of the cardiovascular system.
B10 - Identify the parts of the nervous system.
B12 - Identify the parts of the endocrine system.
B14 - Identify the organs of special sense.

PHYSIOLOGY

C1 - Describe the functions of the cell.
C2 - Describe the functions of bones.
C3 - Describe the functions of muscles.
C4 - Describe the functions of connective tissue.
C5 - Describe the functions of digestive system.
C6 - Describe the functions of cardiovascular system.
C7 - Describe the functions of nervous system.
C8 - Describe the functions of reproductive system.
C9 - Describe the functions of endocrine system.
C10 - Describe the functions of respiratory system.
C11 - Describe the functions of organs of special sense.

ANIMAL BREEDING

Identify and describe the function & parts of the male reproductive system in cattle & swine.
    (B11) Identify the parts of the reproductive system.
    (C8) Describe the functions of the reproductive system.
Identify & describe the function & parts of the female reproductive system in cattle & swine.
    (B11) Identify the parts of the reproductive system.
    (C8) Describe the functions of the reproductive system.
Describe the heritability of traits in animals.
Describe procedures for making genetic improvements in livestock.
Outline a breeding improvement program for swine.(E7)
Outline a breeding improvement program for beef.(E7)
D8 - Distinguish between purebred and crossbred animals.
D9 - Explain complimentary crosses.
E8 - Identify reproductive attributes in breeding stock.
G1 - Describe the different breeding systems.
G2 - Outline the gestation length of each species.
G3 - Outline the estrus cycle of each species.
G4 - Explain methods of heat detection.

G5 - Discuss methods of heat synchronization.
G6 - Describe proper techniques for artificial insemination.
G7 - Describe characteristics of quality semen.
G8 - Describe the components of a breeding soundness examination.
G9 - Describe procedures for pregnancy diagnosis.
G10 - Discuss embryo transfer.
G11 - Identify signs of parturition.
G12 - Assist in delivery of the newborn animal.
G13 - Identify medical signs requiring veterinary assistance.
G14 - Outline procedures for care of the newborn.
G15 - Describe nutritional changes that relate to reproduction.
G16 - Describe disease processes that affect reproduction.
H1 - Define Mendel's Law of Inheritance.
H2 - Distinguish between dominant and recessive traits.
H3 - Define genotype and phenotype.
H4 - Illustrate the meaning of heterosis (i.e., hybrid vigor).
H5 - Explain cell division.
H6 - Discuss the function of DNA and RNA.
H7 - Identify different types of gene action.
H8 - Use heritability estimates to predict genetic progress.
H9 - Select breeding stock using Expected Progeny Difference (EPD).

ANIMAL NUTRITION

Compare the digestive systems of ruminants and non-ruminants and determine how the differences between them affect feeding practices.
(B8) Identify the parts of the digestive system.
(C5) Describe the functions of the digestive system.
List the basic nutrient requirements and six elements of a ration.
(F1) Describe the basic nutrients needed by livestock.
Balance a simple ration.
List common rules of thumb for feeding livestock.
F2 - Distinguish among amino acids those that are essential for livestock production.
F3 - Describe the basic minerals and their functions.
F4 - Describe the basic vitamins and their functions.
F5 - Outline nutrient requirements for each species.
F6 - Identify quality feedstuffs.
F7 - Differentiate between types of feedstuffs.
F8 - Describe feed processing and storage.
F9 - Formulate a complete ration for each species.
F10 - Calculate a least-cost ration.
F11 - Describe the usage of feed additives.
F12 - Describe the different nutritional requirement for maintenance, growth, and production.
F13 - Identify diseases caused by nutritional deficiencies.
F14 - Calculate feed efficiency.
F15 - Calculate rate of gain.
F16 - Calculate production index.

ANIMAL HEALTH

I1 - Outline a herd health program for each species.
I2 - Recognize factors that contribute to diseases.
I3 - Recognize diseases and disease processes.
I4 - Distinguish between infectious and noninfectious diseases.
I5 - Describe methods of disease transmission.

I6 - Identify internal and external parasites.
I7 - Give examples of parasite control.
I8 - Administer prescribed treatments.
I9 - Outline sanitation procedures.
I10 - Describe methods of disinfection.
I11 - Describe methods of sterilization.
I12 - Describe methods of pasteurization.
I13 - Explain the quarantine process.
I14 - Maintain health and treatment records.

ANIMAL FACILITIES

J1 - Describe types of animal housing.
J2 - Describe the fencing requirements for different species.
J3 - Describe designs for working chutes and restraint stocks.
J4 - Describe adequate ventilation and humidity requirements for animal housing.
J5 - Design facilities with adequate feed and water space.
J6 - Describe requirements for facilities regulated by the government.

ANIMAL RESTRAINT

K1 - Restrain livestock manually.
K2 - Adjust and operate large animal restraint equipment.
K3 - Restrain animals with the use of mechanical devices.
K4 - Describe safe loading and transport procedures.
K5 - Demonstrate the use of animal weighing equipment.

PRODUCTION PRACTICES

E1 - Describe cost-effective production practices.
E2 - Maintain individual and herd production records.
E3 - Analyze herd production statistics (i.e., birth and weaning weights).
E4 - Explain the advantages of performance testing.
E5 - Calculate performance data using production records.
E6 - Describe care and use of livestock equipment (clippers, syringes).
E9 - Select breeding stock using performance data.
E10 - Select breeding stock using visual appraisal.

MARKETING

Describe livestock marketing trends.
Explain how cattle prices are determined.
Explain how the value of market hogs are determined.
Explain the carcass weight and grade method of marketing livestock.(L3, L4)
Describe how feeder cattle and feeder pigs are marketed.(L2)
Outline methods of marketing livestock with a protected price.
Explain how futures markets are used to market livestock.(L1)
Explain the importance of basis when marketing agricultural products.
Outline alternative livestock marketing methods.
Describe marketing and pricing methods for milk.
Explain how dairy products are marketed.
Describe how fluid and blend prices for milk are determined.
Describe decisions that should be made when marketing milk.
L1 - Evaluate different types of commodities trading (i.e., futures, hedging).
L2 - Outline live animal market grades.

L3 - Grade animals according to age and quality.
L4 - Explain grades for animal products.
L6 - Prepare an animal for show and sale.
L7 - Describe consumer product selection and utilization.

GOVERNMENT REGULATIONS

M1 - Describe EPA requirements for livestock operations.
M2 - Identify the roles of the Missouri Department of Natural Resources and the Missouri Department of Agriculture in livestock operations.
M3 - Describe handling and disposal of animal waste and hazardous materials.
M4 - Identify local and state ordinances concerning zoning.
M5 - Describe appropriate carcass disposal.
M6 - Describe interstate and intrastate livestock shipping regulations.
M7 - Identify required testing procedures for shipment of animals.
M8 - Identify drug withdrawal periods of animals for slaughter.

BEEF

Combine production information and visual selection to choose superior beef animals.(E9, E10)
Plan a program for managing a breeding herd during breeding and gestation.
Plan a program for managing a herd from calving through weaning.
Plan a management program for backgrounding calves for economical gains.
Describe how to finish cattle to an economical finishing weight.
Determine the profitability of a beef enterprise.
Calculate the cost of production for a beef enterprise.
Evaluate the comparative advantages (labor vs. capital) of the beef enterprise.
Evaluate the major types of beef markets available.
Describe the marketing options available for beef.(L1)
Identify production strategies that will fulfill the chosen beef marketing strategy.
Identify local, state, and federal regulations, as they apply to beef production.
Describe government programs and how they affect the beef industry.
Identify the different beef associations and organizations.
Select breeding stock that will increase the productivity of the beef herd.
Describe the different breeding systems for beef.(G1)
Evaluate the different facilities for producing beef.
Develop a herd health program for the different beef enterprises.(I1)
Evaluate feedstuffs for the most profitable balanced ration.(F10)
Plan a pasture and roughage program for profitable beef production.
D1 - Identify breed characteristics and types of beef cattle.
E20 - Dehorn beef and dairy cattle.
E21 - Castrate beef and dairy cattle.
E22 - Perform ID methods in beef and dairy cattle (i.e., branding, tagging, tattooing).
E25 - Feed beef and dairy through stomach tubes.
E26 - Implant growth hormones in beef and dairy.
E28 - Identify mastitis in goats and beef and dairy cattle using the California Mastitis Test.
I15 - Describe bovine diseases.

SWINE

Select the correct type of swine for efficient, economical production.
Identify practices for management of the breeding herd during breeding and gestation.
Plan a program for managing and caring for the sow and pigs.
Develop a management plan for raising and finishing hogs for maximum returns.
Determine the profitability of a swine enterprise.

Calculate the cost of production for a swine enterprise.
Evaluate the comparative advantages (labor vs. capital) of the swine enterprise.
Evaluate the major types of swine markets available.
Describe the marketing options available for swine.(L1)
Identify production strategies that will fulfill the chosen swine marketing strategy.
Identify local, state, and federal regulations, as they apply to swine production.
Identify government programs and how they affect the pork industry.
Identify the different pork associations and organizations.
Select breeding stock that will increase the productivity of the swine herd.
Describe the different breeding systems for swine.
Evaluate the different facilities for producing swine.
Develop a herd health program for the different swine enterprises.
Evaluate feedstuffs for most profitable balanced ration.
D5 - Identify breed characteristics and types of swine.
E11 - Clip needle teeth in swine.
E12 - Vaccinate swine.
E13 - Dock tail in swine.
E14 - Castrate swine.
E15 - Administer iron shots to swine.
E16 - Repair a hernia in swine.
E17 - Notch ears for identification in swine.
E18 - Treat swine for mange and lice.
I16 - Describe swine diseases.

SHEEP

Identify the opportunities available in the sheep industry.
Combine information and visual selection to choose superior sheep.
Manage a breeding flock during breeding and gestation.
Manage a flock from lambing to weaning.
Manage a flock from weaning to market.
Determine proper prevention and/or control methods of common parasites, diseases, and predators.
Calculate the cost of production for a sheep enterprise.
Evaluate the comparative advantages (labor vs. capital) of the sheep enterprise.
Identify local, state, and federal regulations, as they apply to sheep production.
Evaluate the major types of sheep and wool markets available.
Describe the marketing options available for sheep and wool.(L1)
Identify production strategies that will fulfill the chosen sheep and wool marketing strategy.
Describe government programs and how they affect the sheep industry.
Identify the different sheep associations and organizations.
Select breeding stock that will increase the productivity of the sheep flock.
Describe the alternative breeding systems for sheep.(G1)
Evaluate the different facilities for producing sheep.
Develop a flock health program for the different sheep enterprises.
Evaluate feedstuffs for the most profitable balanced rations.(F10)
Describe flock protection from predators.
D3 - Identify breed characteristics and types of sheep.
E30 - Vaccinate sheep.
E31 - Castrate sheep.
E32 - Dip sheep.
E33 - Tag sheep.
E34 - Dock tails on sheep.
E35 - Clip wool on sheep.
E36 - Drench sheep.

E37 - Sheer sheep.
E38 - Trim hooves on sheep.
E39 - Disbud horns of sheep.
I7 - Describe diseases of sheep and goats.

DAIRY

Select profitable dairy cows for the herd.
Plan a feeding program for maximum milk production.
Plan a dairy herd health program.
Plan a management program for the milking herd to maximize dairy returns.
Plan a management program for raising replacement heifers from birth to freshening.
Determine the profitability of a dairy enterprise.
Calculate the cost of production for a dairy enterprise.
Evaluate the comparative advantages (labor vs. capital) of the dairy enterprise.
Describe the process of milk secretion.
Describe milking and sanitation procedures that will assure quality milk.(E29)
Evaluate the different dairy record and testing systems available.
Plan a profitable milk marketing system.(L1)
Develop a marketing system for replacement animals.(L1)
Identify local, state, and federal regulations, as they apply to dairy production.
Select production practices to match marketing strategies.
Describe government programs and how they affect the dairy industry.
Identify the different dairy associations and organizations.
Select breeding animals that will increase the productivity of the dairy herd.
Describe reproductive technology for dairy.
Analyze the farm situation and select the appropriate facilities and equipment for milk production.(E29)
Evaluate feedstuffs for the most profitable balanced ration.(F10)
Plan a pasture and roughage program for profitable milk production.
D2 - Identify breed characteristics and types of dairy cattle.
E19 - Vaccinate beef and dairy cattle.
E20 - Dehorn beef and dairy cattle.
E21 - Castrate beef and dairy cattle.
E22 - Perform ID methods in beef and dairy cattle (i.e., branding, tagging, tattooing).
E23 - Treat beef and dairy for pinkeye.
E24 - Trim hooves in beef and dairy cattle.
E25 - Feed beef and dairy through stomach tubes.
E26 - Implant growth hormones in beef and dairy.
E27 - Drench beef and dairy animals.
E28 - Identify mastitis in goats and beef and dairy cattle using the California Mastitis Test.
I4 - Describe bovine diseases.

POULTRY

Describe the importance of the poultry industry.
Select and evaluate poultry.
Describe how to meet the nutritional needs of poultry.(F5)
Plan housing and equipment for raising poultry.
Describe procedures for promoting flock health and sanitation.(I1, I9)
Describe various marketing channels for poultry and eggs.(L1)
D7 - Identify breed characteristics and types of poultry.
I8 - Describe diseases in poultry.
L7 - Identify meat and poultry cuts.

MEATS

Identify the career opportunities in the meat industry.
Describe the classifications and grading of meats.(L4)
Identify the wholesale and retail cuts of beef.(L5)
Identify the wholesale and retail cuts of pork.(L5)
Identify the wholesale and retail cuts of lamb.(L5)
Describe how meat is evaluated and the steps in judging meat.
Describe the meat inspection process.
B3 - Identify muscle types.
B4 - Identify muscle groups.

INTRODUCTION TO SPECIALTY ANIMAL PRODUCTION

Identify possibilities for specialty animal production.
Determine the profitability of selected specialty animal enterprises.
Evaluate the comparative advantages (labor vs. capital) of the selected specialty animal enterprise.
Identify local, state, and federal regulations, as they apply to specialty animal production.
Evaluate the marketing options available for specialty animals.(L1)

BEES

Evaluate the different facilities for producing bees.
Develop a check list of bee hive management techniques.
Determine the labor requirements for raising bees.
Develop a health management program for bees.
List the steps to follow when harvesting honey.

COMPANION ANIMALS

Evaluate the different facilities for producing companion animals.
Identify a ration to meet the nutritional needs of companion animals.
Determine the labor requirements for producing companion animals.
Develop a health program for companion animals.
Develop a sound breeding program for companion animals.
Demonstrate proper grooming techniques for companion animals.

FISH

Evaluate the different facilities for producing fish.
Identify a ration to meet the nutritional needs of fish.
Outline procedures for fingerling production.
Determine the labor requirements for producing fish.
Develop a health program for fish.

FUR ANIMALS

Evaluate the different facilities for producing fur animals.
Describe the different breeding systems for fur animals.
Identify a ration to meet the nutritional needs of fur animals.
Determine the labor requirements for producing fur animals.
Develop a health program for fur animal production.

GOATS

Evaluate the different facilities for producing goats.
Identify a ration to meet the nutritional needs of goats.(F9)
Determine the labor requirements for producing goats.
Develop a health program for goat production.(I1)
Plan a breeding program for goats.(G1)
Demonstrate proper grooming techniques for goats.(L6)
D4 - Identify breed characteristics and types of goats.
E28 - Identify mastitis in goats and beef and dairy cattle using the California Mastitis Test.
I7 - Describe diseases in sheep and goats.

HORSES

Determine the profitability of a horse enterprise.
Calculate the cost of production for a horse enterprise.
Evaluate the comparative advantages (labor vs. capital) of the horse enterprise.
Identify local, state, and federal regulations, as they apply to horse production.
Evaluate the major types of horse markets available.
Describe the marketing options available for horses.
Identify the different horse associations and organizations.
Select high quality breeding animals.
Describe the different breeding systems for horses.
Evaluate the different facilities for producing horses.
Develop a herd health program.(I1)
Identify a ration to meet the nutritional needs of horses.(F9)
Identify proper grooming techniques and tack for horses.(L6)
D6 - Identify breed characteristics and types of horses.
E40 - Trim hooves on horses.
E41 - Shoe a horse.
E42 - Vaccinate a horse.
E43 - Deworm a horse.
E44 - Float teeth in horses.
E45 - Outline the reasons horses are not castrated at an early age.
I17 - Describe equine diseases.

LABORATORY ANIMALS

Evaluate the different facilities for producing laboratory animals.
Describe the different breeding systems for laboratory animals.
Identify a ration to meet the nutritional needs of laboratory animals.
Determine the labor requirements for producing laboratory animals.
Develop a health program for laboratory animal production.

RABBITS

Evaluate the different facilities for producing rabbits.
Describe the different breeding systems for rabbits.
Identify a ration to meet the nutritional needs of rabbits.
Determine the labor requirements for rabbit production.
Develop a health program for rabbit production.

SECONDARY COMPETENCIES FOR PLANT SCIENCE

SOIL

Explain the importance of soil.
Prepare a soil sample for analysis.
Discuss factors which cause soils to differ.
Explain the importance of soil color and texture.
Describe soil structure and other physical features important in production.
Identify soil erosion problems and the management practices of soil and water conservation that can affect those problems.
Evaluate a soil's productive capacity.
Calculate fertility needs based on soil sample analysis results.

SOIL CONSERVATION

Explain benefits of soil conservation to Missouri.
Describe how soils are eroded.
List major land resource areas and their uses.
List cropping and tillage systems which are important in conserving soil.
Explain the fundamentals of no-till farming.
Identify structures important for conserving soils.
Develop a soil conservation plan for a farm using the Universal Soil Loss Equation.
List agencies that help farmers conserve soil.

HOW PLANTS GROW

Describe the germination process of corn and bean seeds.
Identify basic plant parts and their functions.
Describe how plants manufacture food from raw materials.
Describe the reproductive process of plants.

PLANT AND PLANT PRODUCT IDENTIFICATION

Identify nursery plants.
Identify floriculture crops.
Identify fruits and nuts.
Identify turf grasses
Identify vegetables.

MAINTAINING ESTABLISHED PLANTS

Maintain lawns and turf.
Maintain orchards and vineyards.
Maintain ornamentals.
Maintain small fruits and vegetables.
Maintain floriculture crops.
Maintain interiorscaping plants.

LANDSCAPING AND INTERIORSCAPING

Develop design.
Develop public area.

Develop service area.
Develop private and family area.
Choose corner plantings.
Choose entrance plantings.
Choose foundation plantings.
Choose ground cover plantings.
Determine areas appropriate for planting.
Determine planting patterns.
Interpret landscape/interiorscape plans.

FLORAL DESIGN

Use correct floral design terminology.
Identify common tools and mechanics used in arranging flowers.
Identify the types of flowers that can be used in floral design.
Identify the basic principals of floral design.
Identify the basic floral design shapes.
Design a fresh floral arrangement.
Design a dried and/or silk floral arrangement.
Perform basic wiring techniques.
Construct bows using basic ribbon widths.
Construct different types of corsages.
Construct different types of boutonnieres.
Construct a floral design using Christmas greens.
Construct wedding floral designs.
Construct funeral floral designs.
Prepare, design, and plant a dish garden.
Prepare, design, and plant a terrarium.
Package florist flowers/arrangements for delivery.

PREPARATION OF SOILS AND PLANTING MEDIA

Take soil samples.
Interpret data of soil sample analysis.
Prepare planting media (soilless mix).
Sterilize (pasteurize) soils/soilless mixes.
Fertilize media/soil.
Plan/construct drainage system.
Apply lime and nutrients (organic and inorganic).
Plan and prepare fields.
Plan and prepare beds.

PREPARATION AND PLANTING OF PLANTS

Maintain dormant plants.
Prepare/plant seeds.
Prepare/plant bulbs, corms, tubers, rhizomes, and roots.
Prepare/transplant seedlings, cuttings, and stolons.
Prepare/transplant large plants.
Apply correct mulch.

PROPAGATION OF PLANTS

Label plants.

Set time clocks for automatic mist propagation.
Propagate plants by taking cuttings.
Propagate plants through layerage techniques.
Propagate plants by division.
Propagate plants by budding.
Propagate plants by grafting.
Remove propagated plants.
Handle propagated plants for shipping or receiving.

CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Pinch flowering plants.
Disbud flowering plants.
Prune plants.
Apply growth regulating chemicals.
Force bulbs (control temperature, moisture, and light).
Apply shade material.
Install black cloth to regulate photoperiod.
Provide the required light intensity and length for photoperiod control.
Adjust or control closed environment temperature.
Provide for low temperature control in fields.
Provide for high temperature control in fields.
Cultivate soils.
Aerate compacted soils.
Provide plant support.
Apply granular fertilizer.
Apply liquid fertilizer.

IRRIGATION PRACTICES

Calculate amount/source of water needed.
Set time control valves.
Hand water plants.
Regulate furrow irrigation.
Regulate overhead irrigation.
Regulate trickle irrigation.

PLANT PEST AND DISEASE CONTROL

Identify plant disease.
Identify insect damage.
Identify chemical and environmental damage.
Identify mechanical damage.
Identify weeds.
Determine correct control procedures.
Safely mix chemicals.
Safely apply chemicals.
Provide biological controls.
Remove diseased plants.
Remove weeds manually from crops.
Remove weeds with mechanical aids.
Set out poisoned bait to eradicate rodents.
Safely store chemicals and equipment.

HARVESTING AND HANDLING OF CROPS

Harvest plants or plant products at proper stage.
Count plants or plant products.
Clean and size harvested plants or plant products.
Load plants for hauling.
Dry harvested crops which require curing.
Treat harvested crops for reduction of spoilage.

PACKAGING, STORAGE AND SHIPMENT

Grade for size and quality plants or plant products.
Place plants or products in proper storage.
Prepare invoices and shipping labels.
Package orders for shipment.
Assemble shipping cartons.
Inventory plants or plant products.
Observe federal and state shipping standards.

MARKETING

Describe the operation of cash grain markets.
Describe the effect of grain grading on price.
Determine an "asking" price for grain.
Outline alternative grain marketing methods.
Explain how futures are used to market grain.

MISCELLANEOUS MAINTENANCE AND REPAIRS

Maintain gasoline engines.
Maintain diesel engines.
Maintain electric motors.
Maintain large implements.
Maintain small implements.
Correctly store implements.
Sharpen hand tools.
Repair growing structures.
Locate and report any malfunctions of liquid injection system.
Repair and maintain spray equipment.

FIELD CROPS OF MISSOURI

Describe the economic importance of field crops in Missouri.
Identify seeds of principal crops and weeds of Missouri.
Identify principal crop and weed plants of Missouri.
Classify Missouri field crops and weeds.
Grade and judge the quality of seed.
Grade and judge the quality of hay.

SOYBEANS

Describe the economic importance of soybean production.
Analyze and select appropriate varieties of soybean seeds to be grown in Missouri.
Compare different tillage systems and select the appropriate system to use.

Identify application rates, types, and methods of fertilizing soybeans.
Identify weed problems of soybeans and describe their methods of control.
Identify planting procedures for soybeans.
Identify and describe control methods for insects and diseases of soybeans.
Describe safe procedures for applying pesticides.
Identify the appropriate moisture management methods for soybeans.
Analyze harvesting, drying, and storing systems for soybeans.
Describe marketing, pricing, and grading procedures for soybeans.
Describe costs and factors that affect the economics of soybean production.

SMALL GRAINS

Describe the soil and climatic adaptations and the uses of small grains.
Select the variety and types of small grains that are best suited to the local area.
Describe the practices necessary to establish a satisfactory stand of small grains.
Describe the factors involved in controlling insects in small grains.
Describe the factors involved in controlling disease of small grains.
Determine the most profitable practices and methods of harvesting and storing small grains.

CORN AND SORGHUM

Describe the economic importance of corn and sorghum production.
Analyze and select appropriate varieties of corn and sorghum.
Describe seedbed preparation in various tillage systems.
Analyze harvesting, storing, and drying systems for corn and sorghum.
Explain methods of controlling weeds in corn and a sorghum.
Compare conservation and conventional planting techniques of corn and sorghum.
Describe procedures for identifying and controlling insects and diseases in corn and sorghum.
Identify steps for obtaining a private pesticide application license and procedures for safe use and storage of pesticides.
Analyze the profitability of different methods of irrigating corn and sorghum.
Explain application rates, types, and methods of fertilizing corn and sorghum.
Describe marketing, pricing, and grading procedures for corn and sorghum.
Describe costs and factors that affect the economics of corn and sorghum production.

FORAGES

Identify how forage crop production contributes to Missouri's agriculture.
Identify major advantages and disadvantages of important forage crop plants.
Select appropriate forage species according to site characteristics, species adaptation, and intended use.
Identify basic principles of alfalfa production.
Identify principles for establishing and maintaining cool season forages.
Identify characteristics of and basic principles for growing native forage grasses in Missouri.
Identify basic principles for establishing and managing warm season annuals for forage.
Identify principles of forage seed crop production.
Describe the symptoms and management control practices for fescue toxicity.
Describe when and how to renovate a pasture.
Plan a year-round forage system for Missouri forages.
Describe and compare different methods of harvesting and storing hay.
Compare production and storage methods for silage and haylage.

FRUIT AND VEGETABLE PRODUCTION (HORTICULTURE)

Describe the preparations necessary for fruit and vegetable production.
Analyze principles of vegetable crop transplant production.
Identify characteristics and production practices for warm season solanaceous crops.
Identify techniques for growing beans, peas, and sweet corn.
Identify techniques for growing cole crops and cucurbits.
Identify techniques for cultivating apples and peaches.
Identify techniques for producing strawberries.
Identify techniques for growing selected bramble fruits.
Identify techniques for cultivating blueberries.
Identify techniques for growing grapes.
Identify approaches for the direct marketing of fresh fruits and vegetables.

FORESTRY CAREERS

Identify careers and benefits from Missouri forest resources.
List and explain the professional career opportunities and their requirements.
List and explain the technical career opportunities and their requirements.
List and explain the job opportunities for forestry workers.

CLASSIFICATION AND IDENTIFICATION

Classify Missouri trees by use and grade.
Identify trees without the use of a key.
Identify forest plants with the use of a key.
Describe the functional characteristics of each species of trees.
Select trees for best commercial usage.
Compare major plant communities within a forest.

FOREST MEASUREMENT

Interpret surface features using area photography and topography maps.
Locate a tract of land by using a map and the legal description.
Make linear measurements by surveyor's chain, pacing, and hand compass.
Determine number of acres in a timber tract.
Identify and demonstrate use of forestry measuring tools.
Measure standing tree height.
Measure diameter breast height.
Determine site index.
Estimate the volume of standing timber.
Identify criteria used in grading trees.

REFORESTATION

Identify soil features relating to species and site selection.
Identify and select proper methods for reforestation.
List characteristics used in selecting a species of trees.
Identify methods of site preparation.
Select a method for site preparation.
Identify sources of tree seeds and seedlings.
Transport and care for tree seedlings from nursery to planting site.
Plant and seed trees by hand and machine.

TIMBER STAND IMPROVEMENT

Identify natural regeneration systems.
Select and utilize thinning methods for a timber stand.
Identify and remove cull trees.
Demonstrate pruning techniques.

FOREST RESOURCE PROTECTION

Describe the potential damages caused by grazing forest land.
Describe how forests affect watersheds.
Describe the damage done by fire and list the ways to prevent forest fires.
Identify common insect and disease problems.
Describe how forest management can affect wildlife.
List effects recreation has on the forest.

FOREST MANAGEMENT PLAN

Identify sources of forestry assistance available to the landowner.
Prepare a sample forest management plan.

FOREST MANAGEMENT ECONOMICS: LANDLORD/INDUSTRY

Develop a forest management plan.
Determine timber markets.
Keep and analyze business records.
Identify tax benefits available for timber landowners.
Prepare and complete a bid form for forest products.
Prepare and complete a timber contract.
Identify sources of forestry assistance available to the landowner.

TIMBER HARVESTING

Select and mark trees to be felled.
Calculate volume of saw logs.
Develop a logging plan.
List chain saw safety procedures.
Demonstrate chain saw maintenance.
Demonstrate the safe use and operation of a chain saw.
List the procedures to follow when felling trees.
List the procedures to follow when limbing trees.
List the procedures to follow when bucking trees.
Explain the process of merchandising logs.
Demonstrate the use of forest harvesting tools and equipment.
Describe procedures to use to protect and avoid mechanical damage to residual timber.

FOREST PRODUCTS

Identify markets for forest products.
Demonstrate the ability to scale logs.
List the defects important to log grading.
List the steps to processing logs.
List the factors affecting grading and scaling lumber.
Demonstrate cutting and measuring firewood.

Identify processing equipment and its use.
List and distinguish between primary and secondary forest products.
Identify and measure cordwood.
Identify 10 different woods by texture and grain.
Identify and evaluate the methods of preserving wood.
Order and plant forest trees.
Describe the safe use of forestry tools.
Measure standing trees, logs, and stacks of cordwood.
Analyze how Timber Stand Improvement (T.S.I) principles can improve forest production.
Identify factors to consider in growing and marketing Christmas trees.
Describe how to produce and market walnut timber.

POSTSECONDARY COMPETENCIES FOR PLANT SCIENCE

A INTRODUCTION TO PLANT PRODUCTION

1 Describe the food chain and its components.
2 Describe the different uses man makes of plants.
3 Identify factors that determine crop distribution
4 Identify the major crops grown in the region and nation.
5 Identify factors related to climate that affect crop distribution.
6 Identify factors related to light that affect crop distribution.
7 Identify factors related to air that affect crop distribution.
8 Identify factors related to soil that affect crop distribution.
9 Describe the economic factors that affect crop distribution.
10 Identify career opportunities and industry in plant science.

B ANATOMY AND PHYSIOLOGY

1 Label the parts of a plant cell and describe their functions.
2 Label the parts of a seed.
3 Describe the process through which a seed germinates.
4 List the different types of seed emergence processes.
5 Describe the structure and function of root systems.
6 Describe the structure and function of leaf systems.
7 Describe the structure and function of stems and modified stems.
8 Describe the growth processes in plants.
9 Explain the effect of growth regulators on plant growth.
10 Outline the reproductive processes that occur in the plant.
11 Distinguish between monocots and dicots on the basis of root and stem production.
12 Describe the use of genetics in plant improvement.

C PLANT IDENTIFICATION AND SELECTION

1 Describe the different classification system of plants.
2 Identify the major forage seeds and plants.
3 Identify the major field crop seeds and plants.
4 Identify the major ornamental seeds and plants.
5 Identify the major truck crop seeds and plants.
6 Describe the factors to consider when selecting a crop.
7 Describe the factors to consider when selecting a variety.
8 Outline the uses of major crops.
9 Identify toxic plants in the region.

D SOIL

1 Describe the process by which soil is formed.
2 Describe the chemical properties of soil.
3 Identify the types of soil structures.
4 Describe the three components of soil texture.
5 Define soil organic matter and list its sources.
6 Describe the effects of organic matter on a soil.
7 Interpret a soil survey.
8 Take a soil sample.
9 Conduct a soil test analysis.

10 Interpret a soil test analysis.
11 Describe the factors that affect the water storage and availability of a soil.
12 Describe the factors that affect movement, penetration, and loss of soil moisture.
13 Identify the factors that affect soil erosion.
14 Determine soil loss by using the Universal Soil Loss Equation.
15 Describe the advantages and disadvantages of soil conservation.
16 Describe the various soil conservation structures.
17 Describe the various soil conservation practices.
18 Identify agencies that assist in soil conservation.
19 Describe programs to conserve soil resources.
20 Develop a soil conservation plan.

E TILLAGE AND PLANTING

1 Explain the purpose of tillage.
2 Identify implements used for seedbed preparation.
3 Explain the advantages and disadvantages of conventional village.
4 Explain the advantages and disadvantages of conservation tillage.
5 Explain the various methods of planting.
6 Determine the most appropriate method of planting.
7 Describe the benefits of cultivating crops.
8 Describe the various methods of cultivating.
9 Explain the effect of tillage on water erosion.
10 Explain the effect of tillage on wind erosion.
11 Calculate breakeven analysis.
12 Calculate yield, cost, and profit.

F HARVESTING AND STORAGE

1 Explain the various methods of harvesting.
2 Determine the appropriate stage of maturity for harvest.
3 Demonstrate the ability to calculate combine harvest loss.
4 Identify the methods of storing grain.
5 Identify the methods of storing hay.
6 Identify the methods of storing silage.
7 Calculate the cost of storage.
8 Operate a moisture tester.
9 Describe the methods of controlling pests in stored crops.

G FERTILIZERS

1 Explain the effects of the three primary elements on plant growth.
2 Identify secondary nutrients essential for plant growth.
3 Recognize nutrient deficiency symptoms in plants.
4 Describe the effect of pH on plant growth.
5 Explain how to adjust soil pH.
6 Describe the three analysis numbers on a fertilizer tag.
7 Describe the various components of a commercial fertilizer.
8 Describe methods of fertilizer application.
9 Determine fertilizer costs and recommendations based on soil analysis.
10 Explain the effects of using animal manures as fertilizer.
11 Explain the effects of green manure crops on soil improvement.
12 Identify crops that may be used as green manure crops.
13 Describe the types of crop rotations and their advantages.

COMBINED COMPETENCIES FOR PLANT SCIENCE

INTRODUCTION TO PLANT PRODUCTION

A1 - Describe the food chain and its components.
A2 - Describe the different uses man makes of plants.
A3 - Identify factors that determine crop distribution.
A4 - Identify the major crops grown in the region and nation.
A5 - Identify factors related to climate that affect crop distribution.
A6 - Identify factors related to light that affect crop distribution.
A7 - Identify factors related to air that affect crop distribution.
A8 - Identify factors related to soil that affect crop distribution.
A9 - Describe the economic factors that affect crop distribution.
A10 - Identify career opportunities and industry in plant science.

ANATOMY AND PHYSIOLOGY

B1 - Label the parts of a plant cell and describe their functions.

PLANT IDENTIFICATION AND SELECTION

C6 - Describe the factors to consider when selecting a crop.
C7 - Describe the factors to consider when selecting a variety.
C8 - Outline the uses of major crops.
C9 - Identify toxic plants in the region.

TILLAGE AND PLANTING

E1 - Explain the purpose of tillage.
E2 - Identify implements used for seedbed preparation.
E5 - Explain the various methods of planting.
E6 - Determine the most appropriate method of planting.
E7 - Describe the benefits of cultivating crops.
E8 - Describe the various methods of cultivating.
E11 - Calculate breakeven analysis.
E12 - Calculate yield, cost, and profit.

FERTILIZERS

G1 - Explain the effects of the three primary elements on plant growth.
G2 - Identify secondary nutrients essential for plant growth.
G3 - Recognize nutrient deficiency symptoms in plants.
G4 - Describe the effect of pH on plant growth.
G5 - Explain how to adjust soil pH.
G6 - Describe what the three analysis numbers on a fertilizer tag mean.
G7 - Describe the various components of a commercial fertilizer.
G8 - Describe methods of fertilizer application.
G9 - Determine fertilizer costs and recommendations based on soil analysis.
G10 - Explain the effects of using animal manures as fertilizer.
G11 - Explain the effects of green manure crops on soil improvement.
G12 - Identify crops that may be used as green manure crops.
G13 - Describe the types of crop rotations and their advantages.
G14 - Outline safety precautions to consider when using chemical fertilizers.
G15 - Describe the environmental hazards of chemical fertilizers.

SOIL

Explain the importance of soil.
Prepare a soil sample for analysis.
Discuss factors which cause soils to differ.
Explain the importance of soil color and texture.(D4)
Describe soil structure and other physical features important in production.(D3)
Identify soil erosion problems and the management practices of soil and water conservation that can affect those problems.(D13)
Evaluate a soil's productive capacity.
Calculate fertility needs based on soil sample analysis results.(D10)
D1 - Describe the process by which soil is formed.
D2 - Describe the chemical properties of soil.
D5 - Define soil organic matter and list its sources.
D6 - Describe the effects of organic matter on a soil.
D7 - Interpret a soil survey.
D9 - Conduct a soil test analysis.
D11 - Describe the factors that affect the water storage and availability of a soil.
D12 - Describe the factors that affect movement, penetration and loss of soil moisture.
D14 - Determine soil loss by using the Universal Soil Loss Equation.

SOIL CONSERVATION

Explain benefits of soil conservation to Missouri.(D15)
Describe how soils are eroded.(D13)
List major land resource areas and their uses.
List cropping and tillage systems which are important in conserving soil.(E3, E4, E9, E10)
Explain the fundamentals of no-till farming.
Identify structures important for conserving soils.
Develop a soil conservation plan for a farm using the Universal Soil Loss Equation.(G5)
List agencies that help farmers conserve soil.(D18)
D16 - Describe the various soil conservation structures.
D17 - Describe the various soil conservation practices.
D19 - Describe programs to conserve soil resources.
E3 - Explain the advantages and disadvantages of conventional tillage.
E4 - Explain the advantages and disadvantages of conservation tillage.
E9 - Explain the effect of tillage on water erosion.
E10 - Explain the effect of tillage on wind erosion.

HOW PLANTS GROW

Describe the germination process of corn and bean seeds.(B3)
Identify basic plant parts and their functions.
(B5) Describe the structure and function of root systems.
(B6) Describe the structure and function of leaf systems.
(B7) Describe the structure and function of stems and modified stems.
Describe how plants manufacture food from raw materials.
Describe the reproductive process of plants.(B6)
B8 - Describe the growth processes in plants.
B2 - Label the parts of a seed.
B4 - List the different types of seed emergence processes.
B11 - Distinguish between monocots and dicots on the basis of root and stem production.
B12 - Describe the use of genetics in plant improvement.
B9 - Explain the effect of growth regulators on plant growth.

PLANT AND PLANT PRODUCT IDENTIFICATION

Identify nursery plants.
Identify floriculture crops.
Identify fruits and nuts.
Identify turf grasses.
Identify vegetables.

MAINTAINING ESTABLISHED PLANTS

Maintain lawns and turf.
Maintain orchards and vineyards.
Maintain ornamentals.
Maintain small fruits and vegetables.
Maintain floriculture crops.
Maintain interiorscaping plants.

LANDSCAPING AND INTERIORSCAPING

Develop design.
Develop public area.
Develop service area.
Develop private and family area.
Choose corner plantings.
Choose entrance plantings.
Choose foundation plantings.
Choose ground cover plantings.
Determine areas appropriate for planting.
Determine planting patterns.
Interpret landscape/interiorscape plans.

FLORAL DESIGN

Use correct floral design terminology.
Identify common tools and mechanics used in arranging flowers.
Identify the types of flowers that can be used in floral design.
Identify the basic principals of floral design.
Identify the basic floral design shapes.
Design a fresh floral arrangement.
Design a dried and/or silk floral arrangement.
Perform basic wiring techniques.
Construct bows using basic ribbon widths.
Construct different types of corsages.
Construct different types of boutonnieres.
Construct a floral design using Christmas greens.
Construct wedding floral designs.
Construct funeral floral designs.
Prepare, design, and plant a dish garden.
Prepare, design, and plant a terrarium.
Package florist flowers/arrangements for delivery.

PREPARATION OF SOILS AND PLANTING MEDIA

Take soil samples.(D8)
Interpret data of soil sample analysis.(D10)

Prepare planting media (soilless mix).
Sterilize (pasteurize) soils/soilless mixes.
Fertilize media/soil.
Plan/construct drainage system.
Apply lime and nutrients (organic and inorganic).
Plan and prepare fields.
Plan and prepare beds.

PREPARATION AND PLANTING OF PLANTS

Maintain dormant plants.
Prepare/plant seeds.
Prepare/plant bulbs, corms, tubers, rhizomes, and roots.
Prepare/transplant seedlings, cuttings, and stolons.
Prepare/transplant large plants.
Apply correct mulch.

PROPAGATION OF PLANTS

Label plants.
Set time clocks for automatic mist propagation.
Propagate plants by taking cuttings.
Propagate plants through layerage techniques.
Propagate plants by division.
Propagate plants by budding.
Propagate plants by grafting.
Remove propagated plants.
Handle propagated plants for shipping or receiving.

CULTURAL AND ENVIRONMENTAL CONTROL PRACTICES

Pinch flowering plants.
Disbud flowering plants.
Prune plants.
Apply growth regulating chemicals.
Force bulbs (control temperature, moisture, and light).
Apply shade material.
Install black cloth to regulate photoperiod.
Provide the required light intensity and length for photoperiod control.
Adjust or control closed environment temperature.
Provide for low temperature control in fields.
Provide for high temperature control in fields.
Cultivate soils.
Aerate compacted soils.
Provide plant support.
Apply granular fertilizer.
Apply liquid fertilizer.

IRRIGATION PRACTICES

Calculate amount/source of water needed.
Set time control valves.
Hand water plants.
Regulate furrow irrigation.

Regulate overhead irrigation.
Regulate trickle irrigation.

PLANT PEST AND DISEASE CONTROL

Identify plant disease.(H14)
Identify insect damage.(H3)
Identify chemical and environmental damage.
Identify mechanical damage.
Identify weeds.(H7)
Determine correct control procedures.
(H6) Determine the most appropriate insect control method.
(H12) Determine the most appropriate weed control method.
(H18) Determine the most appropriate disease control method.
Safely mix chemicals.
(H21) Describe correct methods for mixing pesticides.
Safely apply chemicals.
(H20) Outline safety precautions to consider when using chemical pesticides.
Provide biological controls.
Remove diseased plants.
Remove weeds manually from crops.
Remove weeds with mechanical aids.
Set out poisoned bait to eradicate rodents.
Safely store chemicals and equipment.
F9 - Describe the methods of controlling pests in stored grains.
H1 - Identify insects that affect plants in the region.
H2 - Identify pests by mouth parts.
H4 - Determine the point at which insect control is needed.
H5 - Describe the methods of insect control.
H8 - Describe the losses caused by weeds.
H9 - Explain the economic importance of weed control.
H10 - Describe the control of weeds in the region.
H11 - Determine the point at which weed control is needed.
H13 - Explain the economic importance of disease control.
H15 - Describe the losses caused by plant diseases.
H16 - Describe the control of disease in the region.
H17 - Determine the point at which disease control is needed.
H19 - Interpret information found on a pesticide label.
H22 - Describe the various additives that are used with pesticides.
H23 - Explain the advantages and disadvantages of the different spray equipment.
H24 - Select appropriate spray equipment for various applications.
H25 - Demonstrate the ability to calibrate a sprayer.
H26 - Describe the procedures to obtain a private and/or commercial chemical applicator's license.

HARVESTING AND HANDLING OF CROPS

Harvest plants or plant products at proper stage.(F2)
Count plants or plant products.
Clean and size harvested plants or plant products.
Load plants for hauling.
Dry harvested crops which require curing.
Treat harvested crops for reduction of spoilage.
F1 - Explain the various methods of harvesting.
F3 - Demonstrate the ability to calculate combine harvest loss.

F4 - Identify the methods of storing grain.
F5 - Identify the methods of storing hay.
F6 - Identify the methods of storing silage.
F7 - Demonstrate the ability to calculate the cost of storage.
F8 - Demonstrate the ability to use a moisture tester.

PACKAGING, STORAGE AND SHIPMENT

Grade for size and quality plants or plant products.
Place plants or products in proper storage.
Prepare invoices and shipping labels.
Package orders for shipment.
Assemble shipping cartons.
Inventory plants or plant products.
Observe federal and state shipping standards.

MISCELLANEOUS MAINTENANCE AND REPAIRS

Maintain gasoline engines.
Maintain diesel engines.
Maintain electric motors.
Maintain large implements.
Maintain small implements.
Correctly store implements.
Sharpen hand tools.
Repair growing structures.
Locate and report any malfunctions of liquid injection system.
Repair and maintain spray equipment.

FIELD CROPS OF MISSOURI

Describe the economic importance of field crops in Missouri.
Identify seeds of principal crops and weeds of Missouri.(C3,H7)
Identify principal crop and weed plants of Missouri.(C3,H7)
Classify Missouri field crops and weeds.(C1)
Grade and judge the quality of seed.
Grade and judge the quality of hay.

SOYBEANS

Describe the economic importance of soybean production.
Analyze and select appropriate varieties of soybean seeds to be grown in Missouri.
Compare different tillage systems and select the appropriate system to use.
Identify application rates, types, and methods of fertilizing soybeans.
Identify weed problems of soybeans and describe their methods of control.
Identify planting procedures for soybeans.
Identify and describe control methods for insects and diseases of soybeans.
Describe safe procedures for applying pesticides.
Identify the appropriate moisture management methods for soybeans.
Analyze harvesting, drying, and storing systems for soybeans.
Describe marketing, pricing, and grading procedures for soybeans.
Describe costs and factors that affect the economics of soybean production.

SMALL GRAINS

Describe the soil and climatic adaptations and the uses of small grains.
Select the variety and types of small grains that are best suited to the local area.
Describe the practices necessary to establish a satisfactory stand of small grains.
Describe the factors involved in controlling insects in small grains.
Describe the factors involved in controlling disease of small grains.
Determine the most profitable practices and methods of harvesting and storing small grains.

CORN AND SORGHUM

Describe the economic importance of corn and sorghum production.
Analyze and select appropriate varieties of corn and sorghum.
Describe seedbed preparation in various tillage systems.
Analyze harvesting, storing, and drying systems for corn and sorghum.
Explain methods of controlling weeds in corn and sorghum.
Compare conservation and conventional planting techniques of corn and sorghum.
Describe procedures for identifying and controlling insects and diseases in corn and sorghum.
Identify steps for obtaining a private pesticide application license and procedures for safe use and storage of pesticides.
Analyze the profitability of different methods of irrigating corn and sorghum.
Explain application rates, types, and methods of fertilizing corn and sorghum.
Describe marketing, pricing, and grading procedures for corn and sorghum.
Describe costs and factors that affect the economics of corn and sorghum production.

FORAGES

Identify how forage crop production contributes to Missouri's agriculture.
Identify major advantages and disadvantages of important forage crop plants.
Select appropriate forage species according to site characteristics, species adaptation, and intended use.
Identify basic principles of alfalfa production.
Identify principles for establishing and maintaining cool season forages.
Identify characteristics of and basic principles for growing native forage grasses in Missouri.
Identify basic principles for establishing and managing warm season annuals for forage.
Identify principles of forage seed crop production.
Describe the symptoms and management control practices for fescue toxicity.
Describe when and how to renovate a pasture.
Plan a year-round forage system for Missouri forages.
Describe and compare different methods of harvesting and storing hay.
Compare production and storage methods for silage and haylage.
C2 - Identify the major forage seeds and plants.

FRUIT AND VEGETABLE PRODUCTION (HORTICULTURE)

Describe the preparations necessary for fruit and vegetable production.
Analyze principles of vegetable crop transplant production.
Identify characteristics and production practices for warm season solanaceous crops.
Identify techniques for growing beans, peas, and sweet corn.
Identify techniques for growing cole crops and cucurbits.
Identify techniques for cultivating apples and peaches.
Identify techniques for producing strawberries.
Identify techniques for growing selected bramble fruits.
Identify techniques for cultivating blueberries.
Identify techniques for growing grapes.

Identify approaches for the direct marketing of fresh fruits and vegetables.
C4 - Identify the major ornamental seeds and plants.
C5 - Identify the major truck crop seeds and plants.

FORESTRY CAREERS

Identify careers and benefits from Missouri forest resources.
List and explain the professional career opportunities and their requirements.
List and explain the technical career opportunities and their requirements.
List and explain the job opportunities for forestry workers.

CLASSIFICATION AND IDENTIFICATION

Classify Missouri trees by use and grade.
Identify trees without the use of a key.
Identify forest plants with the use of a key.
Describe the functional characteristics of each species of trees.
Select trees for best commercial usage.
Compare major plant communities within a forest.

FOREST MEASUREMENT

Interpret surface features using area photography and topography maps.
Locate a tract of land by using a map and the legal description.
Make linear measurements by surveyor's chain, pacing and hand compass.
Determine number of acres in a timber tract.
Identify and demonstrate use of forestry measuring tools.
Measure standing tree height.
Measure diameter breast height.
Determine site index.
Estimate the volume of standing timber.
Identify criteria used in grading trees.

REFORESTATION

Identify soil features relating to species and site selection.
Identify and select proper methods for reforestation.
List characteristics used in selecting a species of trees.
Identify methods of site preparation.
Select a method for site preparation.
Identify sources of tree seeds and seedlings.
Transport and care for tree seedlings from nursery to planting site.
Plant and seed trees by hand and machine.

TIMBER STAND IMPROVEMENT

Identify natural regeneration systems.
Select and utilize thinning methods for a timber stand.
Identify and remove cull trees.
Demonstrate pruning techniques.

FOREST RESOURCE PROTECTION

Describe the potential damages caused by grazing forest land.
Describe how forests affect watersheds.

Describe the damage done by fire and list the ways to prevent forest fires.
Identify common insect and disease problems.
Describe how forest management can affect wildlife.
List effects recreation has on the forest.

FOREST MANAGEMENT PLAN

Identify sources of forestry assistance available to the landowner.
Prepare a sample forest management plan.

FOREST MANAGEMENT ECONOMICS: LANDLORD/INDUSTRY

Develop a forest management plan.
Determine timber markets.
Keep and analyze business records.
Identify tax benefits available for timber landowners.
Prepare and complete a bid form for forest products.
Prepare and complete a timber contract.
Identify sources of forestry assistance available to the landowner.

TIMBER HARVESTING

Select and mark trees to be felled.
Calculate volume of saw logs.
Develop a logging plan.
List chain saw safety procedures.
Demonstrate chain saw maintenance.
Demonstrate the safe use and operation of a chain saw.
List the procedures to follow when felling trees.
List the procedures to follow when limbing trees.
List the procedures to follow when bucking trees.
Explain the process of merchandising logs.
Demonstrate the use of forest harvesting tools and equipment.
Describe procedures to use to protect and avoid mechanical damage to residual timber.

FOREST PRODUCTS

Identify markets for forest products.
Demonstrate the ability to scale logs.
List the defects important to log grading.
List the steps to processing logs.
List the factors affecting grading and scaling lumber.
Demonstrate cutting and measuring firewood.
Identify processing equipment and its use.
List and distinguish between primary and secondary forest products.
Identify and measure cordwood.
Identify 10 different woods by texture and grain.
Identify and evaluate the methods of preserving wood.
Order and plant forest trees.
Describe the safe use of forestry tools.
Measure standing trees, logs, and stacks of cordwood.
Analyze how Timber Stand Improvement (T.S.I.) principles can improve forest production.
Identify factors to consider in growing and marketing Christmas trees.
Describe how to produce and market walnut timber.

SECONDARY COMPETENCIES FOR AGRICULTURAL MANAGEMENT

HOW AGRIBUSINESS FUNCTIONS

Define the free enterprise system in relation to the agricultural industry.
Compare the business structures of the four types of agribusiness.
Outline the primary business activities in an agribusiness.
Explain the role of the employee in an agribusiness.
Trace the steps involved in starting an agribusiness.

HUMAN RELATIONS IN AGRIBUSINESS

Discuss the importance of human relations skills and positive personality.
Identify a basic hierarchy of needs which influences human actions and attitudes.
Distinguish between the skills and traits contributing to agribusiness employee success and failure.
Contrast how a worker deals with "superiors," "peers," and "subordinates" on the job.
Relate how constructive criticism can be used to the advantage of an agribusiness worker.
Outline the steps in systematic problem solving.

VERBAL COMMUNICATIONS

Relate steps for effective idea presentation and communication.
Analyze components of the skills of listening and answering questions.
Demonstrate acceptable procedures for answering business telephones and taking telephone messages in an agribusiness setting.
Explain the role and ramifications of nonverbal communications with regard to verbal communications.

WRITTEN COMMUNICATIONS

Explain the need for and the basic elements of effective written communications in agribusiness.
Compose a business letter and an office memorandum.
Prepare a resume, letter of application, and an application form.

SELLING SKILLS

Identify the importance of each person "selling" in agribusiness.
Identify the skills needed to sell in agriculture.
Select appropriate methods of meeting customer needs.
Approach the potential customer.
Give a sales presentation of agricultural supplies and products.
Describe the technique of suggestion selling.
Effectively handle resistance.
Close a sale.

ADVERTISING AND DISPLAY

Describe various methods of promotion as related to agriculture.
Recognize how advertising is used.
Describe the different types of advertising media used.
Identify how to use give-away items or services as promotion.
Identify how to use radio and television as promotion.

Identify how to use direct mail effectively as promotion.
Design an agribusiness display.
Recognize ways of maintaining and increasing the effectiveness of displays.

MARKETING

Describe the functions of a marketing program.
Identify goals to be set for the marketing program.
Explain the importance of basis when marketing agricultural products.
Determine when price ptotection marketing is appropriate.
Describe factors to consider when outlining marketing strategies.

BUSINESS PROCEDURES AND RECORDS

Describe why different business procedures and records are needed in an agribusiness.
Identify how to make customer transactions.
Prepare a weight scales ticket.
Identify the proper procedures for handling credit in an agribusiness.
Describe how inventory is managed and how the selling price of merchandise is determined.
Describe the basic elements of record keeping and checking account procedures.
Identify how sales and purchasing records are kept.
Describe basic income tax requirements for agribusiness.
Identify types of insurance needed by agribusiness to help protect them from losses.
Demonstrate the use of basic parts on a cash register.
Demonstrate the use of an adding machine and an electronic calculator.
Identify the proper procedures in using the microfiched viewing equipment.

PERSONAL MANAGEMENT

Identify the needs and considerations for setting career goals.
Identify social and personal competencies associated with career success.
Evaluate methods for managing personal financial resources.
Identify the types of housing that satisfies personal and career needs.
Identify the types of transportation that satisfies personal and career needs.
Identify possible community resources for help with problems or guidance for personal improvement.

MICROCOMPUTERS IN AGRIBUSINESS

Identify specific applications of microcomputers in agribusiness and sources of software for these applications.
Identify major components of the microcomputer and their functions.
Prepare a fertilizer worksheet using a microcomputer.

SAFETY PRECAUTIONS

Apply first aid techniques.
Follow safe work habits.
Identify and correct potential safety hazards.
Use fire extinguishers.
Wear appropriate protective or work clothing.
Interpret information on labels and signs.
Use proper lifting and carrying methods.
Correctly store flammable materials.

Install and adjust safety devices.
Identify safety zones around equipment.

ECONOMIC PRINCIPLES IN AGRICULTURE

Determine the point of maximum profit.
Determine the fixed and variable costs of production and use the fixed/variable concepts in making business decisions.
Determine when substitution is desirable and what is the most profitable level of substitution.
Determine the opportunity cost of choosing various business alternatives.
Determine the resulting change in price of commodities when shifts in supply and demand take place.
Determine the effects of the time value of money on business investments and decisions.

BUSINESS MANAGEMENT

Compare the different business structures for agricultural businesses.
Identify the steps in buying land.
Explain the factors involved in starting an agricultural business.
Identify and describe key components of contracts.
Explain the importance of business procedures.
Explain the importance of agribusiness records.
Describe how to manage inventory and determine selling price.
Explain how to handle customer transactions.
Prepare a sales ticket.
Describe the proper procedures for handling customer credit in a business.
Explain factors that should be considered before securing a loan.
Complete a financial analysis of a business.
Explain business practices that will maximize after-tax income.
Calculate the depreciation of an investment.
Identify methods of reducing risk in a business.
Explain the types of insurance needs of an agricultural business.
Identify several cooperating agencies and services available.

PLANNING THE FARM BUSINESS

Identify appropriate goal-setting activities that could be used for a farm business.
Determine the present use of resources for a farm business.
Explain the principles of planning a cropping system and be able to revise the cropping system of the case farm.
Calculate machinery needs.
Plan a profitable livestock system.
Plan for the labor needs of a farm business.
Determine the amount of capital needed for the farm business.
Estimate farm business cash income and profitability.
Revise a farm plan.

OPERATING THE AGRICULTURAL BUSINESS

Explain the role of the employee.
Explain the need for effective communication skills in an agricultural business.
Identify skills needed for a successful career in agricultural sales.
Describe the use of promotion in agriculture.
Explain the appropriate use of agriculture displays.

POSTSECONDARY COMPETENCIES FOR AGRICULTURAL MANAGEMENT

A. OVERVIEW OF THE AGRICULTURE INDUSTRY

1 Explain how agriculture fits into the local, state, national, and world economy.
2 Explain the importance of agricultural management.
3 Name the various sectors of the agriculture industry.
4 Identify career opportunities in agriculture.
5 Identify salaries for entry-level and advanced agricultural positions.
6 Describe progression in various careers.
7 Describe education or training required for various positions.

B. ECONOMIC PRINCIPLES

1 Define fixed and variable costs.
2 Explain the four basic factors of production.
3 Differentiate between the three phases of the production function.
4 Describe the effects of diminishing economic returns.
5 Explain input substitution principles.
6 Explain the concept of opportunity cost.
7 Describe how different enterprises relate to each other based on production factors.
8 Describe the role of supply and demand in determining price.
9 Explain the concept of elasticity in relationship to supply and demand.

C. RECORD KEEPING

1 Explain the purpose of record keeping.
2 Identify the types of record keeping systems.
3 Record receipts and expenses in a record book.
4 Prepare financial statements (e.g., cash flow, net worth, profit and loss).
5 Complete a depreciation schedule.
6 Prepare whole and partial budgets for a sample business.

D. FARM PLANNING AND INVENTORY

1 Establish long range business goals.
2 Conduct an inventory of resources.
3 Identify and prioritize business problems.
4 Develop a cropping system.
5 Develop a livestock system.
6 Evaluate income and profitability.
7 Evaluate cash flow feasibility.
8 Develop a business plan.
9 Modify business plan to include adjustments.
10 Explain the importance of maintaining an inventory.
11 Explain the importance of managing an inventory.

E. AGRICULTURAL FINANCE

1 Identify credit sources.
2 Calculate the cost of borrowing money.
3 Calculate true annual interest rates.
4 Describe the different methods of calculating interest.

5 Determine the profitability of an investment.
6 Calculate measures of production efficiency.
7 Complete financial statements required by lenders.
8 Calculate present and future values of an investment.

F. PERSONAL FINANCE

1 Calculate a family living budget.
2 Figure the costs of operating a vehicle.
3 Compare the advantages and disadvantages of owning a house versus renting a house.
4 Demonstrate an understanding of consumer installment credit and how it operates.
5 Explain the characteristics of the various savings institutions.
6 Explain the various investment alternatives (e.g., stocks, bonds, mutual funds).
7 Write a personal check.
8 Reconcile a checkbook with a bank statement.
9 Prepare state and federal income tax returns.

G. ENTERPRISE ANALYSIS

1 Explain the principles of enterprise analysis.
2 Describe the advantages and disadvantages of enterprise analysis.
3 Identify skills needed to conduct an enterprise analysis.
4 Conduct an enterprise analysis on a sample business.
5 Determine how to allocate resources among individual enterprises.
6 Interpret an enterprise analysis.
7 Determine the repayment capacity of an investment.

H. MARKETING

1 Differentiate among the different types of markets.
2 Identify sources of market outlook information.
3 Illustrate the laws of supply and demand.
4 Describe marketing methods.
5 Describe different pricing strategies.
6 Summarize market analyses and market cycles.
7 Describe market distribution.
8 Determine production options based on market availability.
9 Explain grading standards that affect marketing.
10 Develop a complete marketing plan.

I. SALES

1 Demonstrate effective sales presentation techniques.
2 Describe factors which contribute to an attractive agricultural display.
3 Operate equipment used in retail sales.
4 Complete sales records and forms.
5 Calculate sales tax.

J. AGRICULTURE LAW, TAXES, AND INSURANCE

1 Identify the origin of ag law.
2 Identify local, state, and federal regulatory agencies
3 Explain the judicial system and its components.
4 Explain the risks associated with agriculture.

5 Outline the different types of liabilities.
6 Describe the different types of taxes.
7 Explain why tax planning is essential.
8 Identify the types of insurance.
9 Outline the criteria for selecting insurance.
10 Identify the types of contracts used in agriculture.
11 Explain the use of warehouse receipts.
12 Compare leasing versus ownership.
13 Define methods of owning real property.
14 Explain the methods of transferring legal ownership of property.
15 Describe the components of estate planning.
16 Explain the water laws that exist within the state.

K. GOVERNMENT PROGRAMS AND REGULATIONS

1 Identify government agencies involved in agriculture.
2 Describe the programs designed to control commodity production.
3 Identify regulations affecting agricultural employers and employees.

L. COMPUTERS

1 Develop a computer vocabulary.
2 Operate a word processing program.
3 Operate a spreadsheet program.
4 Operate a data base program.
5 Utilize a business accounting package.
6 Operate a decision-making program.
7 Operate an investment analysis program.
8 Determine basic software needs.
9 Determine basic hardware needs.
10 Identify sources of hardware and software.
11 Operate a telephone modem.

M. PERSONAL SAFETY

1 Develop safe work habits and attitudes.
2 Identify where to find directions for equipment use.
3 Maintain equipment in safe working condition.
4 Maintain a clean work space.
5 Identify safety hazards.
6 Describe workmen's compensation regulations.
7 Describe the need for personal health and liability insurance.
8 Identify agencies that provide regulations to maintain safe working environments.

N. HUMAN RELATIONS

1 Demonstrate verbal communication skills.
2 Demonstrate written communication skills.
3 Explain the significance of non-verbal communication.
4 Define ethical behavior.
5 Define ethical and unethical business practices.
6 Explain the advantages of goal setting.
7 Define short- and long-term goals.
8 Develop a personal set of goals.

9 Identify personal strengths and areas of improvement.
10 Explain the steps of effective problem-solving.
11 Utilize problem-solving steps to solve a problem.
12 Identify the elements of effective time management.
13 Create a short-term time management plan.
14 Describe the attributes of effective interviewing.
15 Conduct or participate in a job interview.
16 Demonstrate appropriate client interaction skills.
17 Demonstrate proper techniques for answering a business telephone.
18 Take accurate telephone messages.
19 Demonstrate personal hygiene and grooming techniques.
20 Demonstrate proper etiquette.

COMBINED COMPETENCIES FOR AGRICULTURAL MANAGEMENT

HOW AGRIBUSINESS FUNCTIONS

Define the free enterprise system in relation to the agricultural industry.
Compare the business structures of the four types of agribusiness.
Outline the primary business activities in an agribusiness.
Explain the role of the employee in an agribusiness.
Trace the steps involved in starting an agribusiness.
A1 - Explain how agriculture fits into the local, state, national, and world economy.
A2 - Explain the importance of agricultural management.
A3 - Name the various sectors of the agriculture industry.
A4 - Identify career opportunities in agriculture.
A5 - Identify salaries for entry-level and advanced agricultural positions.
A6 - Describe progression in various careers.
A7 - Describe education or training required for various positions.

HUMAN RELATIONS IN AGRIBUSINESS

Discuss the importance of human relations skills and positive personality.
Identify a basic hierarchy of needs which influences human actions and attitudes.
Distinguish between the skills and traits contributing to agribusiness employee success and failure.
Contrast how a worker deals with "superiors," "peers," and "subordinates" on the job.
Relate how constructive criticism can be used to the advantage of an agribusiness worker.
Outline the steps in systematic problem solving.(N10)
N4 - Define ethical behavior.
N5 - Define ethical and unethical business practices.
N11 - Utilize problem-solving steps of effective problem-solving.
N12 - Identify the elements of effective time management.
N13 - Create a short-term time management plan.
N14 - Describe the attributes of effective interviewing.
N15 - Conduct or participate in a job interview.
N16 - Demonstrate appropriate client interaction skills.
N19 - Demonstrate personal hygiene and grooming techniques.
N20 - Demonstrate proper etiquette.

VERBAL COMMUNICATIONS

Relate steps for effective idea presentation and communication.
Analyze components of the skills of listening and answering questions.
Demonstrate acceptable procedures for answering business telephones and taking telephone messages in an agribusiness setting.
(N17) Demonstrate proper techniques for answering a business telephone.
(N18) Take accurate telephone messages.
Explain the role and ramifications of nonverbal communications with regard to verbal communications.(N3)
N1 - Demonstrate verbal communication skills.

WRITTEN COMMUNICATIONS

Explain the need for and the basic elements of effective written communications in agribusiness.

Compose a business letter and an office memorandum.
Prepare a resume, letter of application, and an application form.
N2 - Demonstrate written communication skills.

SELLING SKILLS

Identify the importance of each person "selling" in agribusiness.
Identify the skills needed to sell in agriculture.
Select appropriate methods of meeting customer needs.
Approach the potential customer.
Give a sales presentation of agricultural supplies and products.(I1)
Describe the technique of suggestion selling.
Effectively handle resistance.
Close a sale.

MARKETING

Describe the functions of a marketing program.
Identify goals to be set for the marketing program.
H1 - Differentiate among the different types of markets.
H2 - Identify sources of market outlook information.
H4 - Describe marketing methods.
H5 - Describe different pricing strategies.
H6 - Summarize market analyses and market cycles.
H7 - Describe market distribution.
H8 - Determine production options based on market availability.
H9 - Explain grading standards that affect marketing.
H10 - Develop a complete marketing plan.

ADVERTISING AND DISPLAY

Describe various methods of promotion as related to agriculture.
Recognize how advertising is used.
Describe the different types of advertising media used.
Identify how to use give-away items or services as promotion.
Identify how to use radio and television as promotion.
Identify how to use direct mail effectively as promotion.
Design an agribusiness display.(I2)
Recognize ways of maintaining and increasing the effectiveness of displays.

BUSINESS PROCEDURES AND RECORDS

Describe why different business procedures and records are needed in an agribusiness.(C1)
Identify how to make customer transactions.
Prepare a weight scales ticket.
Identify the proper procedures for handling credit in an agribusiness.
Describe how inventory is managed and how the selling price of merchandise is determined.
Describe the basic elements of record keeping and checking account procedures.
Identify how sales and purchasing records are kept.
Describe basic income tax requirements for agribusiness.(J6)
Identify types of insurance needed by agribusiness to help protect them from losses.(J8)
Demonstrate the use of basic parts on a cash register.(I3)
Demonstrate the use of an adding machine and an electronic calculator.(I3)
Identify the proper procedures in using microfiche viewing equipment.

D3 - Identify and prioritize business problems.
D4 - Develop a cropping system.
D5 - Develop a livestock system.
D7 - Evaluate cash flow feasibility.
D9 - Modify business plan to include adjustments.
D8 - Develop a business plan.
J9 - Outline the criteria for selecting insurance.
I5 - Calculate sales tax.
J11 - Explain the use of warehouse receipts.
C2 - Identify the types of record keeping systems.
C3 - Record receipts and expenses in a record book.
C4 - Prepare financial statements (e.g. cash flow, net worth, profit and loss)
C6 - Prepare whole and partial budgets for a sample business.

PERSONAL MANAGEMENT

Identify the needs and considerations for setting career goals.(N7, N8)
Identify social and personal competencies associated with career success.
Evaluate methods for managing personal financial resources.
Identify the types of housing that satisfies personal and career needs.
Identify the types of transportation that satisfies personal and career needs.
Identify possible community resources for help with problems or guidance for personal improvement.
F1 - Calculate a family living budget.
F2 - Figure the costs of operating a vehicle.
F3 - Compare the advantages and disadvantages of owning a house versus renting a house.
F4 - Demonstrate an understanding of consumer installment credit and how it operates.
F5 - Explain the characteristics of the various savings institutions.
F6 - Explain the various investment alternatives (e.g., stocks, bonds, mutual funds).
F7 - Write a personal check.
F8 - Reconcile a checkbook with a bank statement.
F9 - Prepare state and federal income tax returns.
N9 - Identify personal strengths and areas of improvement.

MICROCOMPUTERS IN AGRIBUSINESS

Identify specific applications of microcomputers in agribusiness and sources of software for these applications.(I9)
Identify major components of the microcomputer and their functions.(L1)
Prepare a fertilizer worksheet using a microcomputer.
L2 - Operate a word processing program.
L3 - Operate a spreadsheet program.
L4 - Operate a data base program.
L5 - Utilize a business accounting package.
L6 - Operate a decision-making program.
L7 - Operate an investment analysis program.
L8 - Determine basic software needs.
L9 - Determine basic hardware needs.
L11 - Operate a telephone modem.

SAFETY PRECAUTIONS

Apply first aid techniques.
Follow safe work habits.(M1)

Identify and correct potential safety hazards.(M5)
Use fire extinguishers.
Wear appropriate protective or work clothing.
Interpret information on labels and signs.
Use proper lifting and carrying methods.
Correctly store flammable materials.
Install and adjust safety devices.
Identify safety zones around equipment.
M2 - Identify where to find directions for equipment use.
M3 - Maintain equipment in safe working condition.
M4 - Maintain a clean work space.
M6 - Describe workmen's compensation regulations.
M7 - Describe the need for personal health and liability insurance.
M8 - Identify agencies that provide regulations to maintain safe working environments.

ECONOMIC PRINCIPLES IN AGRICULTURE

Determine the point of maximum profit.
Determine the fixed and variable costs of production and use the fixed/variable concepts in making business decisions.(B1)
Determine when substitution is desirable and what is the most profitable level of substitution.(B5)
Determine the opportunity cost of choosing various business alternatives.(B6)
Determine the resulting change in price of commodities when shifts in supply and demand take place.
(B8) Describe the role of supply and demand in determining price.
(H3) Illustrate the laws of supply and demand.
Determine the effects of the time value of money on business investments and decisions.(E8)
B2 - Explain the four basic factors of production.
B3 - Differentiate between the three phases of the production function.
B4 - Describe the effects of diminishing economic returns.
B7 - Describe how different enterprises relate to each other based on production factors.
B9 - Explain the concept of elasticity in relationship to supply and demand.

BUSINESS MANAGEMENT

Compare the different business structures for agricultural businesses.
Identify the steps in buying land.
Explain the factors involved in starting an agricultural business.
Identify and describe key components of contracts.(J10)
Explain the importance of business procedures.
Explain the importance of agribusiness records.(C1)
Describe how to manage inventory and determine selling price.(D11, H5)
Explain how to handle customer transactions.
Prepare a sales ticket.(I4)
Describe the proper procedures for handling customer credit in a business.
Explain factors that should be considered before securing a loan.
Complete a financial analysis of a business.(C4,D6,G4)
Explain business practices that will maximize after-tax income.
Calculate the depreciation of an investment.
(C5) Complete a depreciation schedule.
Identify methods of reducing risk in a business.
Explain the types of insurance needs of an agricultural business.(J8)
Identify several cooperating agencies and services available.

D1 - Establish long range business goals.
D2 - Conduct an inventory of resources.
D3 - Identify and prioritize business problems.
D7 - Evaluate cash flow feasibility.
D9 - Modify business plan to include adjustments.
D10 - Explain the importance of maintaining an inventory.
E1 - Identify credit sources.
E2 - Calculate the cost of borrowing money.
E3 - Calculate true annual interest rates.
E4 - Describe the different methods of calculating interest.
E5 - Determine the profitability of an investment.
E6 - Calculate measures of production efficiency.
E7 - Complete financial statements required by lenders.

PLANNING THE FARM BUSINESS

Identify appropriate goal-setting activities that could be used for a farm business.(N6)
Determine the present use of resources for a farm business.(D2)
Explain the principles of planning a cropping system and be able to revise the cropping system of the case farm.(D4)
Calculate machinery needs.
Plan a profitable livestock system.(D5)
Plan for the labor needs of a farm business.
Determine the amount of capital needed for the farm business.
Estimate farm business cash income and profitability.(D6)
Revise a farm plan.(D8)

OPERATING THE AGRICULTURAL BUSINESS

Explain the role of the employee.
Explain the need for effective communication skills in an agricultural business.
Identify skills needed for a successful career in agricultural sales.
Describe the use of promotion in agriculture.
Explain the appropriate use of agriculture displays.(I2)

ENTERPRISE ANALYSIS

G1 - Explain the principles of enterprise analysis.
G2 - Describe the advantages and disadvantages of enterprise analysis.
G3 - Identify skills needed to conduct an enterprise analysis.
G4 - Conduct an enterprise analysis on a sample business.
G5 - Determine how to allocate resources among individual enterprises.
G6 - Interpret an enterprise analysis.
G7 - Determine the repayment capacity of an investment.

AG LAW, TAXES, AND INSURANCE

J1 - Identify the origin of ag law.
J2 - Identify local, state, and federal regulatory agencies
J3 - Explain the judicial system and its components.
J4 - Explain the risks associated with agriculture.
J5 - Outline the different types of liabilities.
J12 - Compare leasing versus ownership.
J13 - Define methods of owning real property.

J14 - Explain the methods of transferring legal ownership of property.
J15 - Describe the components of estate planning.
J16 - Explain the water laws that exist within the state.

GOVERNMENT PROGRAMS AND REGULATIONS

K1 - Identify government agencies involved in agriculture.
K2 - Describe the programs designed to control commodity production.
K3 - Identify regulations affecting agricultural employers and employees.